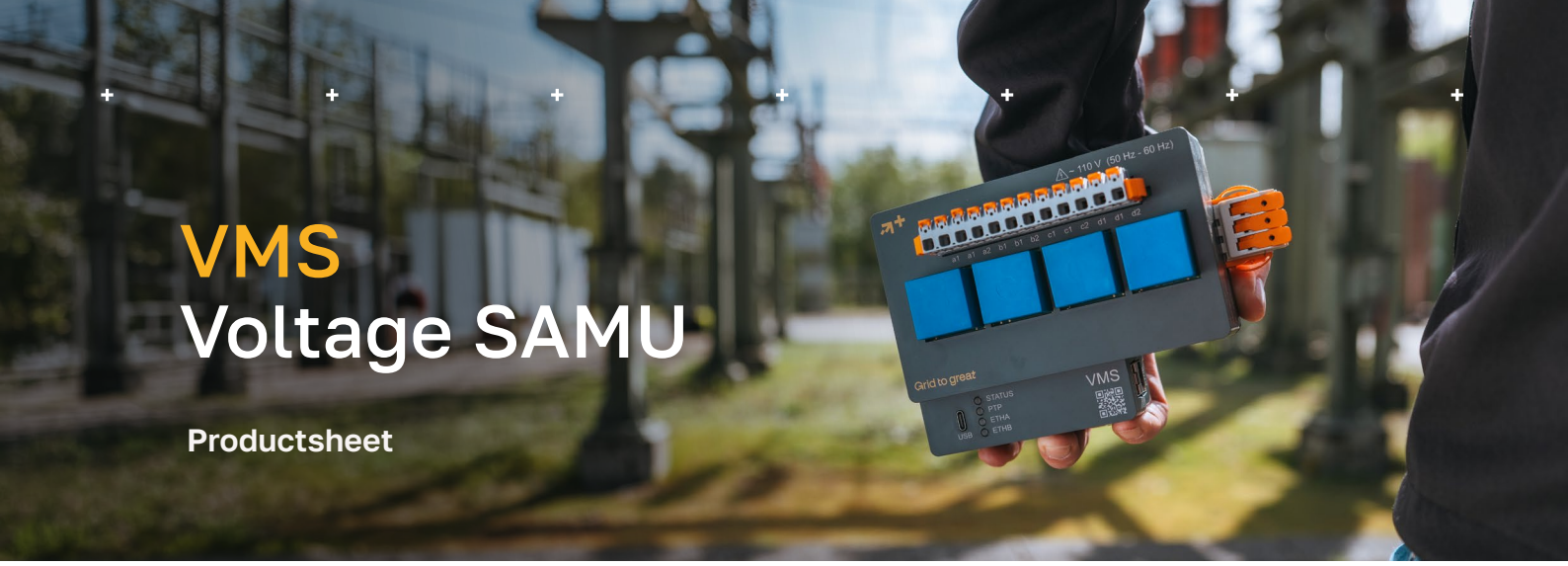

VMS
Voltage SAMU

Productsheet

The Voltage SAMU (VMS) is a Stand Alone Merging Unit that measures and digitizes the secondary output of conventional instrument transformers (CT) in Transmission Level substations as well as Distribution level substations. The VMS is designed according to the IEC61869-13 standard for both Protection Automation and Control and Quality Metering and outputs the measured voltages as Sampled Value streams. This provides for a full separation of the equipment for functional applications and the equipment that is installed close to the primary equipment.

The VMS drives the continued adoption of IEC 61850 standard for Software Defined Substations and will fundamentally change the grid protection automation and control (PAC) landscape.

KEY BENEFITS

- Extremely long operational life expectancy that matches that of primary equipment.
- Compact form factor supports field installation options into switch yard cabinets, and metal-clad switchgear.
- User friendly device management (configuration and maintenance) using Grid to Great's intuitive ICT suite application.
- Two fully separate measurement groups, one for protection automation and control and one for quality measurements (power quality and energy metering).
- Designed for two concurrent SV streams, one for Protection Measurements and one for Quality Measurements using IEC61869-9 preferred profile variants and support for IEC61850-9-2LE.
- Full integration into the digital substation through two Ethernet ports (100BASE-FX and 1000BASE-X) that support IEC62439-3 network redundancy (PRP/HSR) and IEC61588 Precision Timing Protocol (PTP). Single network connection is also supported by disabling options for HSR/PRP.
- Supports Power profile (IEEE C37.238:2011), extended Power profile (IEEE C37.238:2017) or Power utility profile (IEC 61850-9-3:2016).
- Full interoperability with protection relays from other vendors allows for a separation of functional layers from the hardware suppliers (vendor agnostic HW platform).
- Migration path towards a fully software defined substation.

APPLICATIONS

- Process Interface Unit for bay digitization utilizing conventional and virtual protection relay's.
- Process Interface Unit for Grid to Great virtual Process Interface software-defined substation suite
- Phasor Measurement Unit (IEEEE C37.118)
- Protection, Automation and Control applications
- Differential protections schemes.
- Quality measurements such as energy metering and power quality
- Voltage Transformer Control.
- Transmission and distribution network congestion applications.

FLEXIBILITY

Extremely long mission time
Critical installations are designed for an operational life for several decades that is at least twice that of the equipment installed in the secondary installations. The VMS is designed to meet the lifetime requirements of the primary installation. This saves the cost and risks of primary outage, time consuming engineering and site installation work when replacing secondary equipment when it reaches the end of its life or when a more flexible approach that only a full software defined substation can offer is required.

Future Proof and Interoperable
The VMS complies with the IEC 61869-13 standard for Merging units. Its two Small Formfactor Ports (SFP) support the legacy 100Mbit Ethernet as specified by the IEC61850-9-2 Light Edition (LE) implementation guideline as well as 1Gbit Ethernet as required by IEC61869-9. Additional profile variants such as F4800S2IxUy and F14400S6IxUy can be made available through a firmware update. This allows the VMS to be used for inter-bay and inter-substation applications such as differential protection schemes (e.g. distance and line differential protections).

In combination with the optional **Virtual Merging Unit** software application from Grid to Great that is deployed on an Edge Computer Platform, the VMS can be installed without a device specific configuration. This not only improves operational security and safety but also reduces time consuming engineering and maintenance cost.

The VMS is also prepared for Phasor Measurements according to IEEE C37.118 standard.

SAFETY

Transmitting the instrument transformers´ measurements digitally through optical fibers avoids that current and voltage circuits have to be extended from the plant to the relay room, which not only reduces the risk of inadvertent operation of these circuits but also reduces the interference of large electromagnetic fields to the equipment installed in the plant allowing for a safer work environment for personnel performing commissioning and maintenance works on-site.

Cyber Security
The VMS is designed to the guidelines of the European Network for Cyber Security (ENCS) and supports future functional and security updates (e.g. compliance to IEC62443) through signed firmware updates.

Reduce the engineering effort and cost
With the VMS as a process interface unit, digital substation designers can fully benefit from the flexibility provided by modular universal protection and automation relays. This allows for a reduction of devices, less engineering effort and over the lifetime less maintenance effort.
Furthermore, the VMS allows for a drastic reduction in trenches, ducts, glands, cable trays and copper hardwiring, as the VMS provides its sampled values to digital protection relays with process bus support using a fiber optic Ethernet network and PTP enabled switches. Information exchange amongst digital protection relays can then also occur digitally. This adds to a further reduction of cables and engineering complexity as extensive wiring schematics are replaced by standardized version-controlled configuration files.

Switchyard modelling and digitization
As process interface unit, the VMS can be configured to the IEC 61850-7-4 data model and becomes an extension of the Voltage Transformer (VT) through the TVTR logical node

RELIABILITY

The VMS is designed as a flexible, redundant solution to meet the requirements for application cyber physical systems. Depending on the application, the user can enable the IEC62439 standard Parallel Redundancy Protocol (PRP) or High Availability Seamless Redundancy (HSR) for seamless recovery following a single fault network failure. This allows the VMS to be applied for main and backup, or dual main applications, each connected to different cores of the line CTs and individual protection.